

## Claims

1. A system for printing data on a printer comprising:

- 5           a) one or more clients that include applications programs having a print capability;
- b) a server that implements a server print spooler for co-ordinating the printing of data communicated to said server by the one or more clients; and
- c) one or more printers coupled to the server for printing under direction of the server print spooler; wherein
- 10           d) a client includes a client print spooler running that communicates with at least one of said one or more printers by asynchronous remote procedure calls to the server print spooler.

15           2. The system of claim 1 wherein said server spooler includes a thread manager for maintaining a thread pool for servicing pending client print requests by communicating data to the plurality of printers.

20           3. The system of claim 1 wherein the server print spooler implements a completion port wherein incoming print requests from the clients are added to the completion port.

             4. The system of claim 1 wherein the server print spooler maintains a list of print requests awaiting servicing and wherein the list of print requests are added to a thread pool that shares processor time of the server.

25           5. The system of claim 4 wherein multiple thread pools are created to service the print request and each thread pool is serviced by a single processor thread.

             6. The system of claim 1 wherein the client print spooler implements certain procedures asynchronously and some of said procedures are implemented in a synchronous manner.

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7. The system of claim 1 wherein the clients send data to the server print spooler in multiple asynchronous requests until an entire print job is completed.

8. The system of claim 1 additionally comprising a scheduler for sending print requests to a thread pool for processing.

9. The system of claim 8 wherein the scheduler chooses print requests from a first print processing thread pool and adds to a second print processing thread pool.

10. The system of claim 8 wherein the scheduler sends raw data to the thread pool in an overlapped manner.

11 A method of printing data originating from a plurality of clients on a plurality of printers comprising:

a) providing a print spooler interface for an application to communicate with a client which in turn communicates with a print server; said print spooler interface enabling the one or more applications to call a service routine on the print server by means of an asynchronous remote procedure call originating with the one or more applications; and

b) implementing a scheduler on the print server computer that responds to the request from the client for print services by allocating print server run time amongst print requests sent to the server by one or more computer applications.

12. The method of claim 11 wherein the scheduler implements one or more thread pools to service print requests from the multiple computer applications.

13. The method of claim 12 wherein the one or more thread pools are implemented by a completion port wherein incoming print requests from the client computers are added to the completion port.

14. The method of claim 11 wherein the print server maintains a list of print requests awaiting servicing and wherein the list of print requests are added to a thread pool that shares processor time of the a print server computer.
- 5 15. The method of claim 14 wherein multiple thread pools are created to service the print requests and each thread pool is serviced by a single processor thread.
16. The method of claim 11 wherein the client print spooler interface implements certain procedures asynchronously and some of said procedures are implemented in a  
10 synchronous manner.
17. The method of claim 11 wherein the client request a print job made up of multiple print requests which are sequentially communicated to the print server computer in multiple asynchronous remote procedure calls.
- 15 18. The method of claim 11 wherein a scheduler sends print requests to a thread pool for processing.
19. The method of claim 18 wherein the scheduler chooses print requests from a first  
20 print processing thread pool and adds the requests to a second print processing thread pool.
20. In a client/server computing system, a method for implementing a server print spooler comprising:
- 25 a) receiving asynchronous client print requests by means of a communications channel that conveys print requests to a server print spooler;
- b) placing the client print requests into a queue of such print requests; and
- c) scheduling print output from a subset of said print requests at a selected print  
location by placing the subset of said print requests in a thread pool serviced by a  
30 processor thread which switches between servicing the print requests in the thread pool.

21 A computer readable medium for implementing a print spooler for printing data originating from a plurality of clients on a plurality of printers comprising instructions for:

5 a) providing a print spooler interface for a computer application to communicate with a server; said print spooler interface enabling the one or more applications to call a service routine on a print server by means of an asynchronous remote procedure call originating with said application; and

10 b) implementing a scheduler on the print server that responds to the request from the client for print services to allocate server run time amongst print requests sent to the server by multiple computer applications.

22. The computer readable medium of claim 21 wherein the thread pool is implemented by a completion port wherein incoming print requests from a client are added to the completion port.

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23. The computer readable medium of claim 21 wherein the print server maintains a list of print requests awaiting servicing and wherein the list of print requests are added to a thread pool that shares processor time of the server.

20 24. The computer readable medium of claim 23 wherein multiple thread pools are created to service the print requests and each thread pool is serviced by a single processor thread.

25 25. The computer readable medium of claim 21 wherein the print spooler interface implements certain procedures asynchronously and some of said procedures are implemented in a synchronous manner.

30 26. The computer readable medium of claim 21 wherein a print job made up of multiple print requests which are sequentially communicated to the print server in multiple asynchronous remote procedure calls.

27. The computer readable medium of claim 21 wherein a scheduler sends print requests to a thread pool for processing.

28. The computer readable medium of claim 27 wherein the scheduler chooses print  
5 requests from a first print processing thread pool and adds the requests to a second print processing thread pool.